Timestamp: 4/19/2016 2:48:29

Title of Proposed Observation:

Short-term Active Region Evolution

Main Objective:

To determine the short term evolution of the magnetic field and chromosphere and transition region of an active region

Scientific Justification:

Chromospheric and transition region heating in active regions are strongly correlated with the magnetic field. Various theoretical models predict that heating through braiding of magnetic field lines, reconnection with newly emerged flux, or dissipation of Alfven waves may play an important role in heating the chromosphere and transition region. To properly study the correlation between the magnetic field and low-atmospheric heating and to distinguish between various heating models, studies of the evolution of active regions on timescales of minutes to hours over the course of a few days are critical. Such high-cadence studies over a longer period of time can track the evolution of both the fields and the chromospheric/transition region heating as flux emergence and large scale flow patterns change the Poynting flux input into the solar atmosphere.

Medium-size raster scans of high-quality measurements of the photospheric magnetic field with SOT/SP, as well as chromospheric and transition region lines with IRIS and transition region and corona lines with EIS, every 20-30 minutes over the course of 1-2 days, for several viewing angles (mu=0.5, mu=0.8 and disk center) will be important.

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Dates:

ToO, At least 1-2 days continuously per target

Time window:

Ideally not interrupted by any synoptic observations

Target(s) of interest: Active region

SOT Requests:

Medium-size raster scan with SP, with repetition rate of 20 minutes or so. SP 0x01A1 is a Fast Map with 45x81" FOV, that repeats every 20 minutes. This program uses 3.0 Gbits per day (with margin factor 1.05), and it may be edited to change the repetition interval to 15 minutes if telemetry allows, or longer if necessary.

EIS Requests:

A new study called "ar_evolution" which Peter Young is preparing.

XRT Requests:

Two filter observations (Al-poly and thin-Be, or thin-Be and med-Be) observations, with 60s cadence, AEC enabled, and FOV of 384"x384" (e.g., XOB#1B20, or XOB#1AFF).

IRIS Requests:

Ideally:
3630010059 | Large sparse 64-step raster 63x120 64s Deep x 15 Lossless compres | 1061.22 | 1013.76 | 1.0 | 16.6+/-0.1 | 1061+/-0 | 66.3+/-0.0 | 66.3+/-0.0 | 66.3+/-0.0 | 66.3+/-0.0

If telemetry does not allow running this the whole day, then run one of these alternatives for half the day: 3620010059 | Large sparse 64-step raster 63x120 64s Deep x 15 | 1061.22 | 1013.76 | 0.7 | 16.6+/-0.1 | 1061+/-0 | 66.3+/-0.0 | 66.3+/-0.0 | 66.3+/-0.0 | 66.3+/-0.0

or worst case: 3640010059 | Large sparse 64-step raster 63x120 64s Deep x 15 | 1039.90 | 608.26 | 0.4 | 16.2+/-0.1 | 1040+/-0 | 65.0+/-0.0 | 65.0+/-0.0 | 65.0+/-0.0 | 65.0+/-

Additional instrument coordination:

None.

Previous HOP information:

Many HOPs and publications, but most recently HOP 236 which led to De Pontieu et al., Science, 2014, Rouppe van der Voort et al., 2015, Martinez-SYkora et al., 2016, Skogsrud et al., 2015, 2016, etc... Also HOP 249 on spicules, led to Pereira et al., 2014, Skogsrud et al., 2015.

Additional Remarks:

Minimum duration of each run should be 1 full day, ideally longer (if telemetry allows)

The target should be the same active region at three different viewing angles: one at mu=0.5, one at mu=0.8 and one at disk center

Hinode pointing should be corrected for the usual SOT offset, but there are NO additional offsets internal to SOT.

The target coordinates could be chosen either by the Hinode or IRIS planners, depending on the phase of the Hinode planning cycle.